said draft adjacent said stern being between approximately one percent (1%) and approximately four and one-half percent (4.5%) of said beam of said stern portion.

REMARKS

Reexamination of this application is respectfully requested.

The antecedent basis and the indefiniteness rejections of the first and second paragraphs of the office action are believed to have been resolved by the submission of new claims **13-20** and the cancellation of claims **3-12**.

Regarding the rejections of the claims under the double patenting provisions of paragraphs 4 and 5 of the office action, applicant believes that the enclosed claim modifications overcome the examiner's rejection based on the double patenting. Furthermore, in respect to provisional rejection relative to Calderon's co-pending application 09/677,897, the following is remarked:

(a) The present application, TH II, covers the subcritical and super critical hydrodynamic regimes, and includes important relationships, specifically bow draft as a percentage of stern beam, stern draft as a percent of stern beam distance between center of waterplane area and center of gravity as a percent of waterplane length; and also important criteria on entry angle of waterplane, and exit angle in profile.

(b) On the other hand, co-pending application 09/677,897 (TH III) covers the hydrodynamics of TH beyond the super critical regime, namely the hypercritical regime, the transplanar regime, and the X-regime. In addition, TH III covers important improvements on TH's hull shape and controls, TH's under surface structures, TH's structures above surface to achieve stealth shapes and smooth riding; and multihull applications of TH.

Amendments are being introduced herein, and may be introduced in application 09/677,897, to clarify distinctions and overcome the current problem between TH II and TH III. Again, however, should the examiner believe that the claims as amended still fall within the scope of the prior patents and the pending application, Applicant will gladly submit a terminal disclaimer to correct the

deficiency.

The examiner rejected claims **1-12** under 35 U.S.C. § 102(b) as being anticipated by Mills.

Applicant understands examiner's reasons for rejection of claim 1 and 2 and in respect to rejection of claims 1 and 2 and others on the Mills 1894 patent, applicant would like to share with examiner the following information and developments.

(a) Applicant in his researches has found the book Cutwater by Robert Duncan (Top Ten Publishing Company, Novato, CA) showing photos of various powered boats built in the period 1910 to the mid 1930's, which embody principal hull design teachings of Mills' Fig. 2, which, it should be noted, is the only figure in Mills which is designed for use as a boat hull (see the Mills specification). Photos of those boats in static condition (V=O) and with various forward speeds are available in this book. The photos confirm that Mills-type hydrodynamics are different in kind from applicants' TH. For example, the Mills type hulls at all speeds make lateral waves and even throw water sheets outwardly, as in attached Figs. A, B, C, D and E from Cutwater, becoming white water at higher speeds attained in racing conditions. These flows are contrary to TH's technology of inward flows shown in Figs. 14 (c) and 14 (d) of patent 6,158,369. Also, Mills' type hulls have a large positive hull angle of attack at high speed, as shown in attached Figs. C and D from Cutwater, which is contrary to negative angle of attack of the undersurface of TH in the supercritical regime in applicants' Fig. 5.

To further confirm the different type of hydrodynamic and other different characteristics of Mills, applicant further informs the following.

(b) Powered models of Mills' hull built by applicant with its submerged portion built as per Mills' Fig. 2, are in the process of being tested for flow field evaluation at weight corresponding to Mills' waterplane. It can be advanced already that Mills' type hull does indeed generate a classical bow wave as conventional hulls do, and applicant's TH hull does not. Photographs and tests of a model of Mills' Fig. 2 are being provided demonstrating classical wave making patterns of Mills' Fig. 2 in adverse contrast with the applicant's flow pattern as shown in Figure 3 of the instant application.

(c) Moreover, the envelope of crosssections of Mills' Fig. 2, taken from Mills' patent and

shown in Fig. 1 attached, has lateral concavities, due to its having only two wetted surfaces necessarily twisted, with each section flat but the resulting envelope concave. On the other hand, the analysis of TH's crosssections, for example, as shown in Fig. 2 attached, taken from Fig. 14 (m) of Calderon's US patent 6,158,369, shows a completely different situation, that of a single envelope of crosssection which has two flat sides, even though each section has three surface components; two lateral and a third surface facing downwards which is not a keel line. This is a clear patentable distinction which is now claimed in amended claim 13.

ON THE ALLOWABILITY OF THE CLAIMS OF THIS AMENDMENT

Considering the new experimental and analytical information on Mills' review above, it is respectfully suggested that allowance of generic claims different from those of US patent 6,158,369 is merited. Accordingly, new claims are being presented in this amendment, which overcome the rejection on Mills, which are distinct from claims 1-41 of application 09/677,897, and which are also distinct from the claims of US patent 6,158,369. The following review establishes the allowability of the amended claims and the newly submitted claims herein pursued.

Amended claim 1 is believed to be allowable over Mills as the only Mills body pertaining to boats is his Figure 2 (page 2, col. 1, lines 15-26). Given his underbody shapes, conventional wave patterns are generated (see two attached photos). Mills teaches a ratio of bow draft to beam of 0.5 or 50%, using twisting crosssections and curved underbody profile and curved planview. By contrast, Calderon's TH uses different types of geometry in the body allowing for a different geometry ratio of bow draft to stern beam, which, as measured in his drawings, are approximately 0.22 for β in his Figure 1, approximately 0.33 for β' in his Figure 1 with the hydrofields shown in Figure 3 and approximately 0.26 for β'' in his Figure 4. These are qualitatively and patentably distinct ratios over Mills which are now claimed in amended claim 1, support for which is taken from the drawings and specification. Claim 2 is believed to be allowable with claim 1 for these reasons and for the material disclosed and claimed therein.

Regarding new claim 21, the new case of β" in Figure 4, referred to above, is the result of having established a new distance, namely a stern draft for TH as a function of stern beam. The quantified relation is shown in Figure 6. New claim 21 now establishes that the stern draft to stern beam ratio is between 1% and 4.5%, taken from the low drag bucket of the upper curve of Figure 6A. This curve shows important drag benefits of adhering to the draft teachings of applicant.

Generic claim 13 should be allowable over Mills in that it specifies an adequately defined submerged body portion of TH having three, and not two, principal surfaces, and therefore is contrary to Mills' Fig. 2 for boats. As was discussed previously, Mills' Fig. 2 is the only embodiment "which represents the application of (Mills') invention to boats and other craft partially immersed in water. (Mills') Fig. 2 forms that part of the hull at an below water line" (Mills pg. 2, column 1, lines 20-24). Furthermore, Mills states that Fig. 2 "illustrates the form (of the hull) where but two sides are to be subjected to the action of the resulting medium" (Mills pg. 1, column 1, lines 13-15) with "each of these diagonal sides thus making ... in its entire length, a traverse twist of 90 degrees, but in opposite direction" (Mills pg. 1, column 2, lines 89-90).

In further support of claim 13, newly added Fig. 2b show that TH has not two, but three principal immersed surfaces of the TH hull; please note that the crosssections of Figure 2a correspond directly to the Mills Figure 2 as prior art and the crosssections of Figure 2b correspond directly to Figs. 1 and 2 of present application and thus present no new matter. As can be clearly seen in comparing the two figures, there is a qualitative patentable difference between Mills' hull with two wetted surfaces, and Calderon's hulls having three wetted surfaces. Hence, the language of the second half of claim 13, recites: "said body portion being further characterized in having three principal longitudinal surface components, two of which form principal right and left side surface elements of said body portion, and with the third principle longitudinal surface component forming a principal bottom surface element of said body portion". It is respectfully indicated that the term "principal surface element" cannot be construed as a keel or an edge as at the bottom of Mills' Figure 2.

Claim 13 incorporates a very important distinction between Mills and Calderon, which frees

Calderon's hull form from the need to have twisted side surfaces essential in Mills, which in Mills' necessarily pushes water outwardly at all speeds, and prevents the inward flows of TH described in Figs. 14(c) and 14(d) of Calderon US patent 6,158,369.

Dependent claim 14 specifies the qualitative distinction of TH hull shapes as "seen" by the oncoming flow arriving to the hull: "with the projections of said crosssections in end view forming a peripheral envelope of crosssections which has two flat surfaces". This is qualitatively distinct from the envelope of crosssections of Mills' hull, which in end view necessarily has concave shapes facing generally sideways in opposite directions, as has already been reviewed.

Independent claim 15 pertains to the critical angle of entry of the TH, and is directly supported in the specification, specifically on pg. 6, line 22. "The semi angle of entry is of small magnitude 7.1°, as shown in the drawing". This angle is very important for the hydrodynamics of TH and claim 15 should be allowed for these reasons.

Dependent claim 16 is made dependent on claim 15 and covers the preferred exit flow angle claimed in original claim 11, now canceled. Furthermore, it is believed that the new claim language clarifies those elements that applicant is claiming as his invention, thus resolving the 112 rejections.

Dependent claim 17 is made dependent on claim 16 and covers the features claimed in original claim 12, now canceled.

Independent claim 18 replaces independent claim 4, now canceled, but pertains to the same stern draft feature of TH. It is supported by Fig. 6(a) and its corresponding text, as follows: Pg. 10, line 3, to begin with: "For equal stern and bow draft, hydrodynamic drag is very large and the concepts of subcritical and supercritical speed regime of TH would not apply or make sense". This statement applies directly to generally triangular hulls such as the Japanese patent 61-125981 A, and to U.S. Patent No. 23,626, which teach equal drafts at bow and stern. Accordingly, it is shown in Fig. 6(a) that for triangular hulls the corresponding static draft ratio $\Delta Z/B$ for a fixed reasonable weight of the figure is 0.08%. In contrast, Pg. 10, lines 6 - 8 teach "...in the super critical regime at $V\sqrt{L} \approx 1.45 \approx$ the static draft (for TH) should be approximately 0.02. Then the hydrodynamic payoff is a drag reduction of 34%, extremely important for range and speed, apart from large gains of

stability in pitch".

However, Fig. 6(a) itself shows that for triangular waterplane, the ratio ΔZ/B, static draft to beam, when bow draft is significantly larger than stern draft, has 0.02 as a low point of a drag bucket, and drag reductions of the order of 30% are attainable for draft/beam ratios less than approximately 0.04, compared to the drag for ΔZ/B of 0.08, in which bow and stern drafts are equal. The curve was obtained with experimental data. Claim 18 clearly covers an important design feature and should be allowable.

The next two claims cover important features of TH which allows it to overcome the need of a bulb found in the prior art, specifically the cited Japanese patent which states "This (the bulb) allows the ship layout to be easily designed in such a manner as the center of buoyancy may coincide with the center of gravity ... and enables possible hull oscillations at a high speed cruising speed to be retained."

Independent claim 19 is supported directly by Fig. 6(b), which shows the lower limit of LCG/L, the ratio of the distance between stern and CG to the length of the waterplane, which ratio is approximately 0.38 or 38%, below which pitch instability occurs. As explained in Pg. 9, lines 27-28, in the old art (i.e. equal drafts as in Japanese), the ΔZ/B = 0.081 calls for a LCG/L of about 33% as shown in Fig 6(b), which is not viable for pitch stability as found out by Japanese. The relationship of Fig. 6(b) was determined by model tests, and its corresponding claim covering a new solution over the prior art and thus should be allowable.

Claim 20 replaces independent claim 8 pertaining to the same subject matter of claim 8 and pitch stability, i.e., LCF and CG, which is critical as explained and specified in the specifications as follows: Pg. 6, line 20 indicates that LCF (i.e. center of area of waterplane) "is inherently (for a triangular waterplane) at one third of length waterplane forward of the stern" i.e. 33%. Pg. 11, line 9, indicates a center of gravity of 41% waterline length, but allows operation as low as 38.5% of that length (line 18). Accordingly, the distance between LCF and CG should be no less than 5.5% of length of waterplane, and claim 20 recites "no less than approximately 5%." This distance is shown in Fig. 5 as Δ XCG, and the claim should be allowable.

It should be clear that the present invention as claimed is allowable over the prior art, but to assist the examiner in making his determination, Applicant would propose the following. At this time, applicant has three copending applications with the examiner, the present invention and application serial numbers 09/677,897 and 09/677,583. Applicant has conducted considerable theoretical and experimental work, pertaining to these applications, with principal research summarized in tables, photos of flows, and a 4-part video covering experimental model work in a tow tank, with electric powered and gas powered models. Tests are in calm water, waves in the bay, and ocean surf. Applicant respectfully requests an interview pertaining to the three applications, to present models (including Mills' model) and related information, regarding the allowability of claims submitted prior to the interview, and prior to examiner's action on the amendments. It is respectfully proposed that the interview should take place in February or at a later time to be mutually determined. The examiner may contact Applicant's counsel of record to arrange a meeting, and it is hoped that the examiner is amenable to such a meeting, as it is believed that it will be enlightening for the examiner and accelerate the patenting process. Please contact Applicant's counsel Adam H. Jacobs at (402) 345-9035 or by fax at (402) 341-5344 to arrange this interview.

It is believed that the present amendments add no new matter and place the claims in condition for allowance over the cited prior art. Applicant further would like to thank the examiner for his time and efforts in communicating the deficiencies in the originally filed application, and has attempted to correct them in this amendment.

Applicant is mailing this amendment after expiration of the three month response period but within the third month's extension of time permitted by 37 C.F.R. § 1.136 and accompanied by the fee set forth in 37 C.F.R. § 1.17(a). This application is thus believed to be in condition for allowance of all claims remaining herein, and such action is respectfully requested.

Respectfully submitted,

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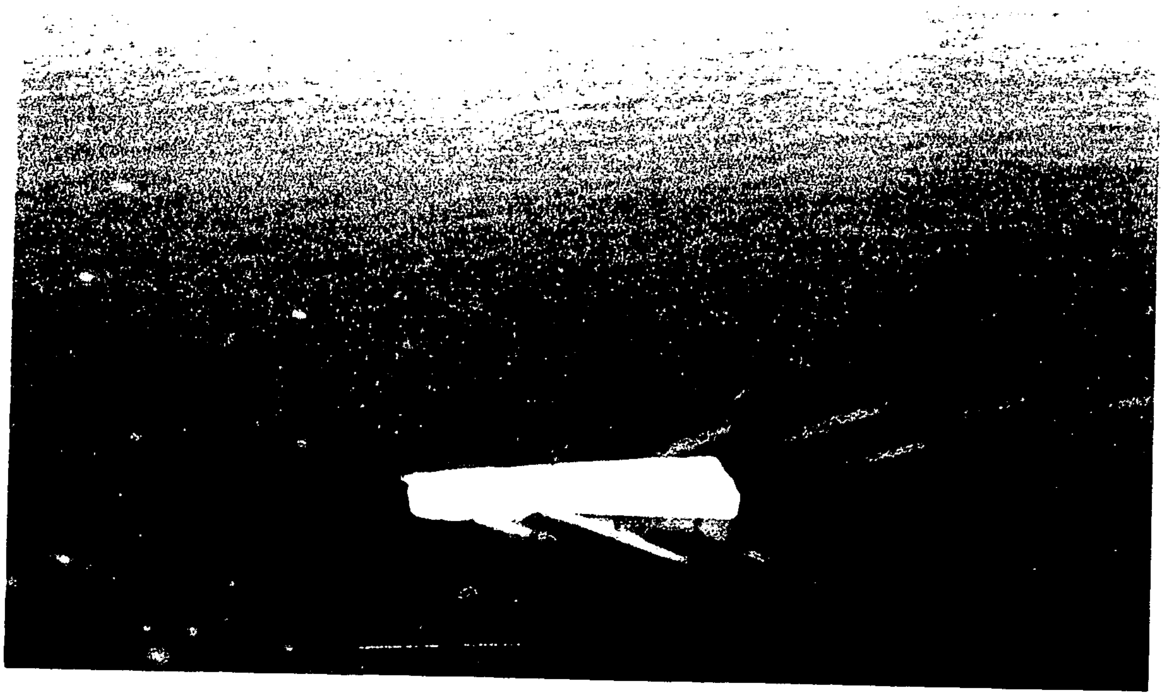
Attorney for Petitioner

CERTIFICATE OF MAILING

I hereby certify that this Amendment for a TRANSONIC HULL AND HYDROFIELD II, Serial № 09/672,190, was mailed by first class mail, postage prepaid, to the Commissioner of Patents and Trademarks, Box RESPONSES/ NO FEE, Washington, DC 20231, on this 20th day of December, 2001.

Adam H. Jacobs



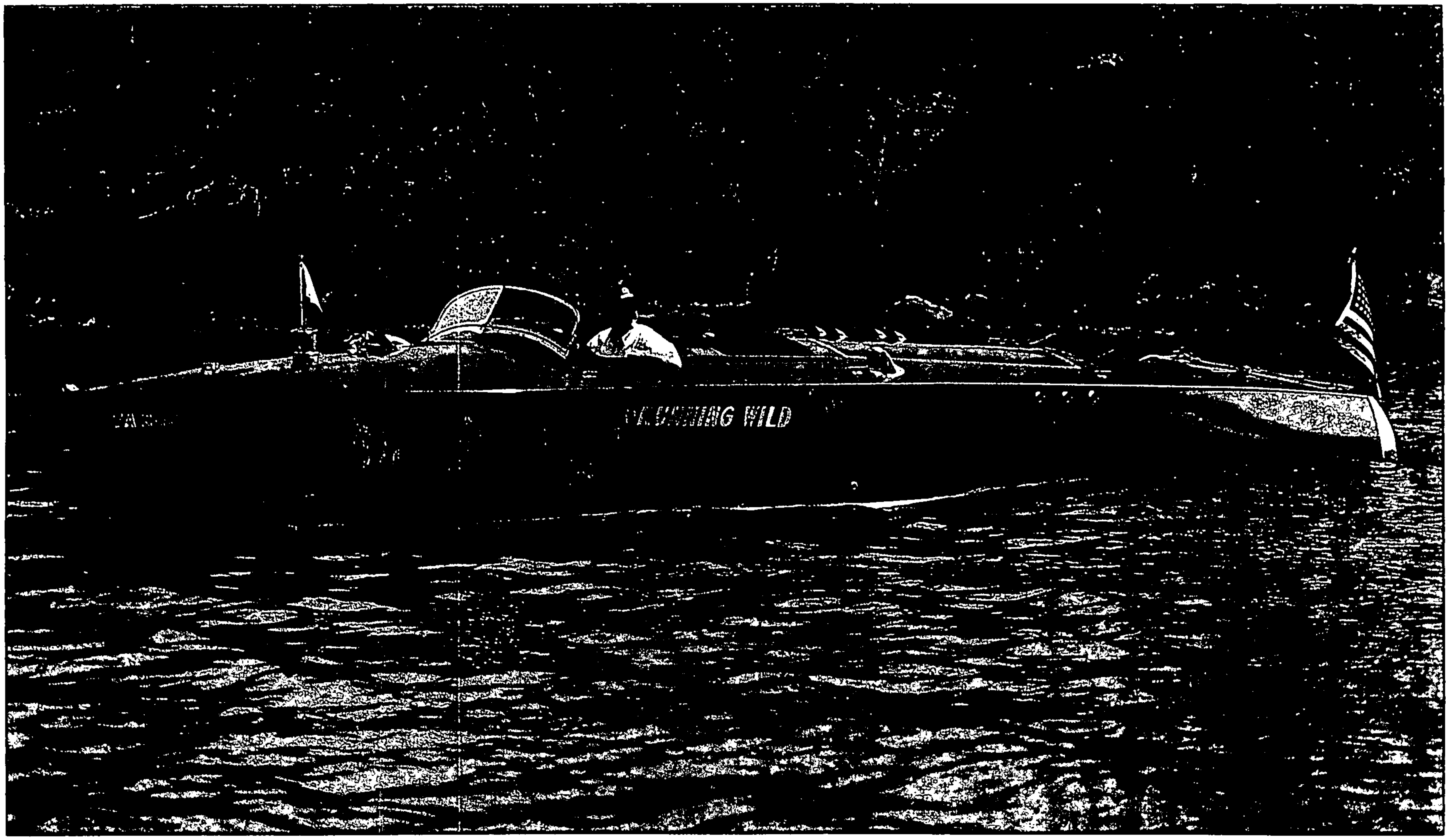
PHOTOS OF MODEL BOAT WITH UNDERBODY (WETTED) AS PER FIG 2 OF MILLS 514 835. - UNDERBODY IS SCALED AS PER DWG. of MILLS. BOAT IS POWERED.

A

to 1500 islands). Sometime around 1880 wealthy families discovered this summer haven, and island summer estates with expansive Victorian homes were built in places like Comfort Island, Dark Island and Heart Island with its Boldt Castle. For many the Thousand Islands were just a balmy place to escape the heat and stress of

RUNNING WILD

urban summer living, but with the advent of power boating, those who could afford it, and probably a few that couldn't, fell victim to the seduction of speedboat racing. And perhaps they found the long summer days tedious, and just needed something to replace the excitement of big business deals.



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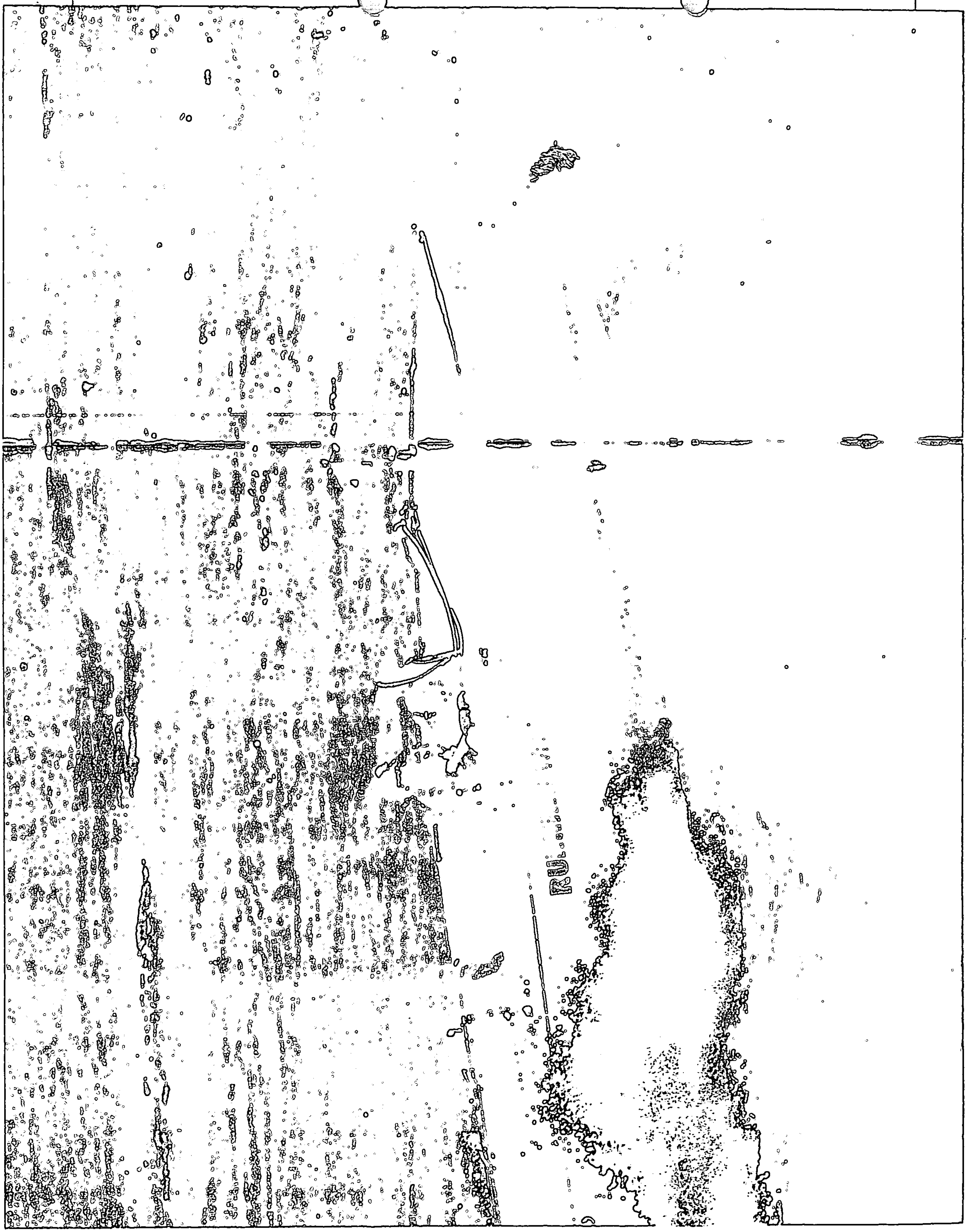


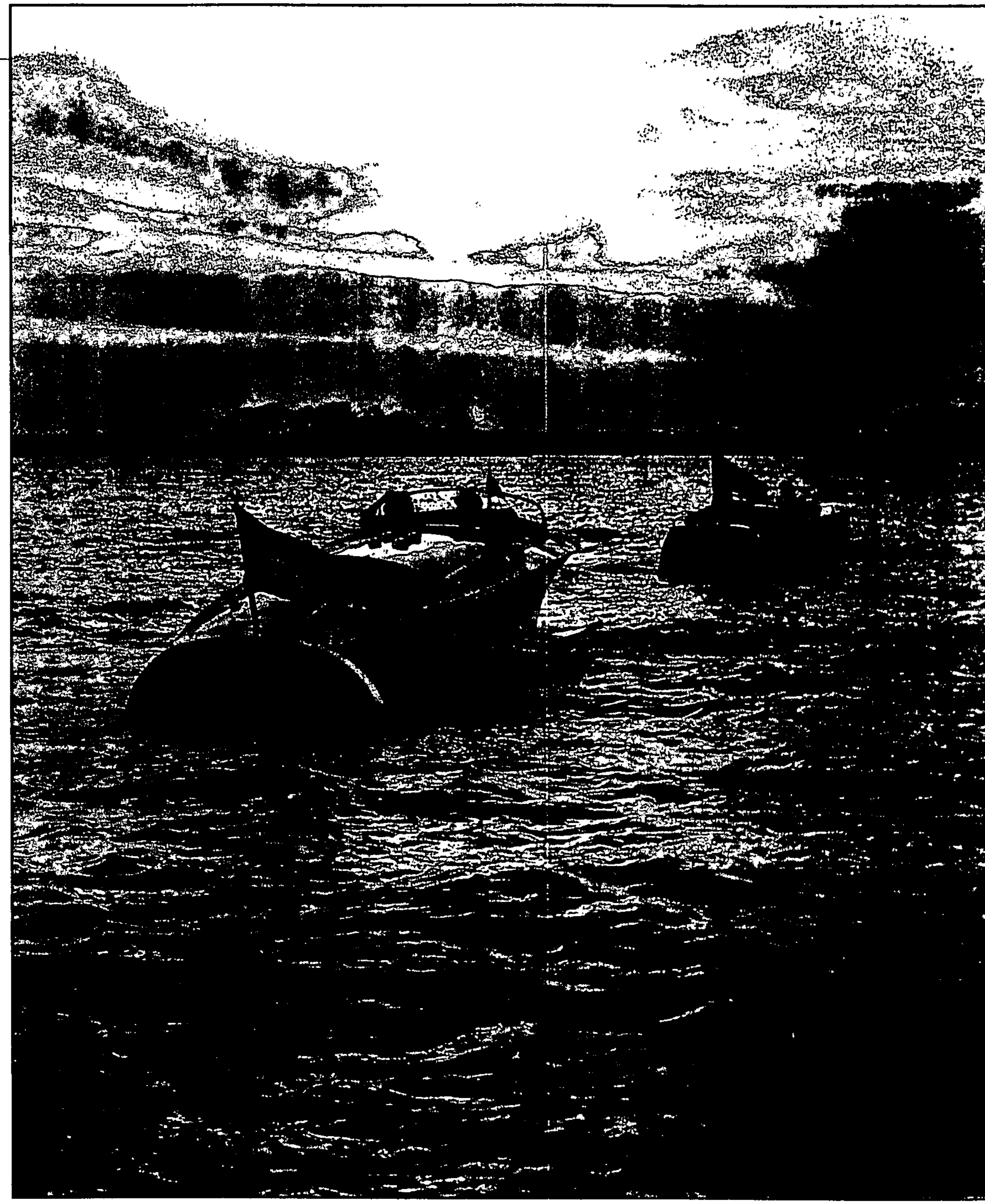
sioned by Martin Shaughnessy, a wealthy industrialist with a summer home in Cape Vincent. She raced regularly on the St. Lawrence, taking part in local "Free For All" races, gala events sponsored by the respective Chambers of Commerce of St. Lawrence communities like Clayton, Cape Vincent and Alexandria Bay.

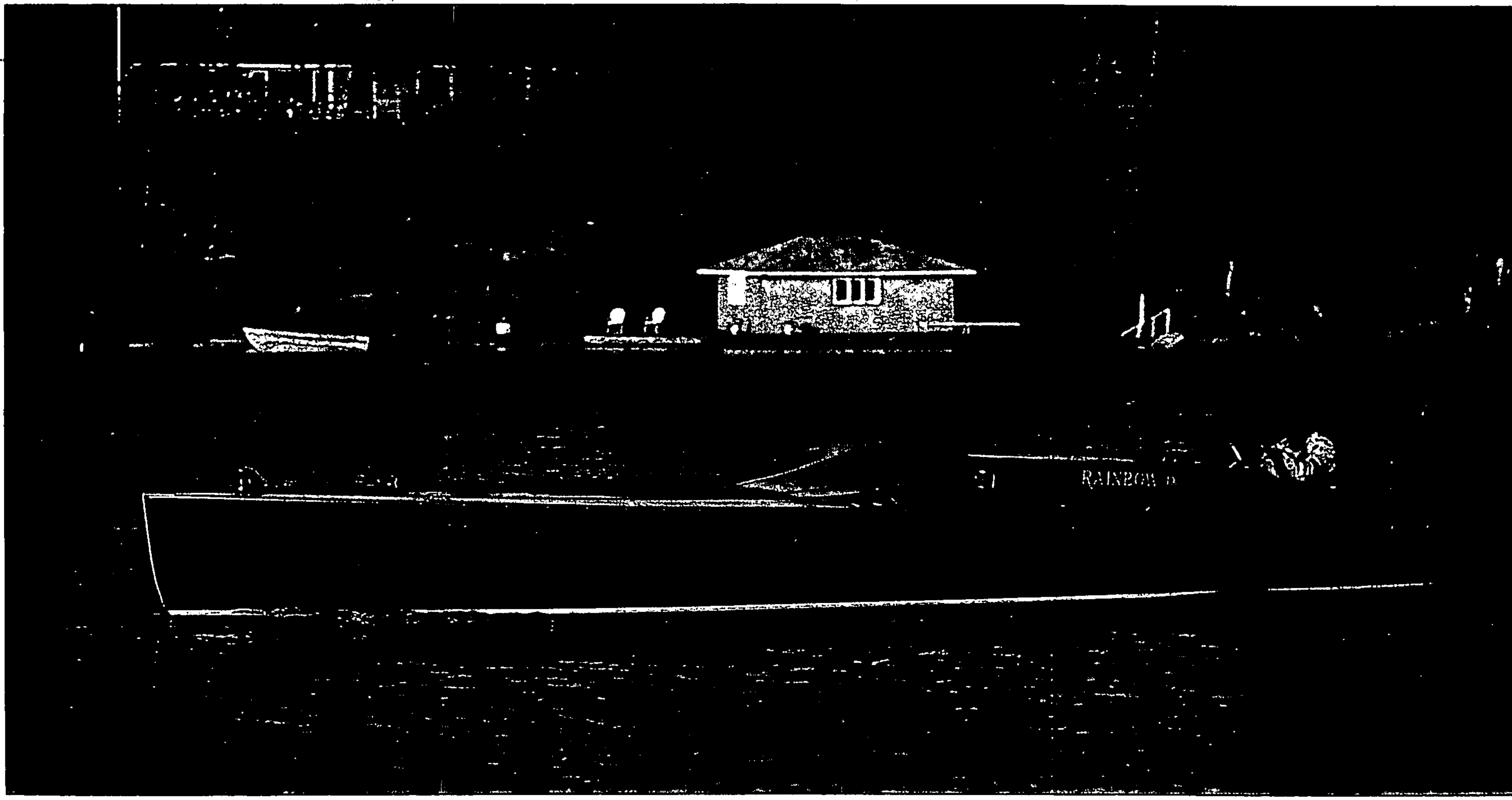
Newspaper clippings tell us *Running Wild* won several races in 1926; she had a tendency to trade trophies back and forth with *Snail*, another legendary boat, owned by Edward Noble who invented "Lifesaver" candies.

In the early twenties, any boat with Liberty power was fast, and although it isn't certain that her current engine is the original Liberty with which she was commissioned, she'll still leave almost everyone in her wake, running somewhere between 50 and 60 miles per hour.

Some suspect that the identity of the gifted designer who laid down *Running Wild's* lines 70 years ago is questionable. All indications, and the opinions of those with a mind for history and an eye for lines, suggest that *Running Wild* is a John Hacker creation. Dick Clarke of Sierra Boat, Mark Mason of New England Boat and Motor, and Don Price, proprietor of St. Lawrence Restoration (and *Running Wild's* owner since 1981), agree with other experts that *Running Wild* looks and performs like a product of John Hacker's drawing board. In confirmation, *Running Wild's* fittings are indeed vintage Hacker hardware.

Over 30 feet long, Liberty-powered, the unique product of both an inspired designer, John Hacker, and an exceptional local builder, Roy Stanley... and most importantly still on the water, *Running Wild* in the flesh brings power boat dreams and history alive.





Packard's Colonel Jesse G. Vincent, in a precedent-setting race, won the Gold Cup. Racing for the first time under new rules, Vincent piloted *Packard Chriscraft*, the first boat to bear the Chris-Craft name, albeit not hyphenated.

In an innovative move Vincent, the chief of engineering for Packard, had removed six cylinders of a 12 cylinder Packard engine in order to comply with hastily adopted engine-displacement restrictions.

Although it was the ninth consecutive Gold Cup victory for Chris Smith-built hulls, it was the first victory for Chris-Craft, and brought to an end a string of five consecutive victories by Gar Wood-driven boats.

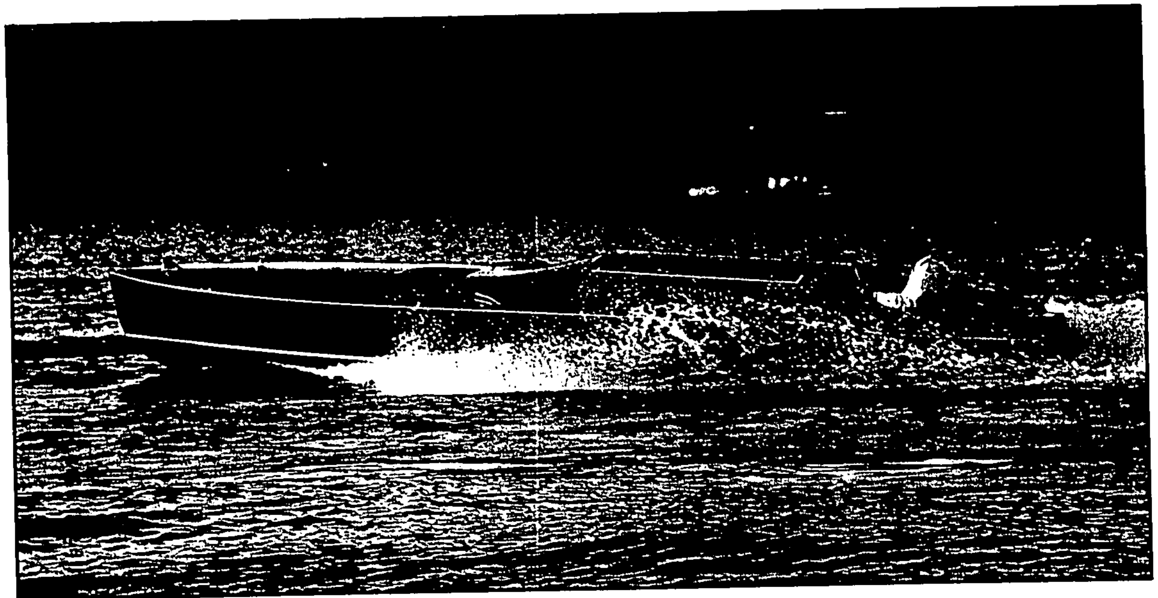
There were 19 Smith-designed boats in the race. The winning *Packard Chriscraft* is said to be the hull on which successive thousands of Chris-Craft runabouts were based.

The historical evidence is that *Rainbow IX* is the victorious *Packard Chriscraft*, one of at least four hulls built by Smith for Jessie Vincent. In addition to the original *Packard Chriscraft*, the other three were *Miss Packard, Packard Chriscraft II*, and *Packard Chriscraft III.*

It was the first Gold Cup victory for Colonel Vincent, who went on to win again in 1923. But Vincent's 1922 Gold Cup, and even his 1923 Gold Cup, pale in comparison to a lifetime of accomplishments in a variety of endeavors that probably would not be possible in today's era of specialization.

Colonel Jesse G. Vincent co-designed the Liberty Aircraft engine, the World War I powerplant which was and remains the engine of choice for twenties and thirties speedboats. Despite being self-educated, Vincent was Packard's chief engineer, a brilliant innovator who designed racing and production automobiles and managed Packard engineering for four decades.

Following the 1922 Gold Cup victory, Packard designed and produced a purpose-built Packard Gold Cup 6 that featured four valves per cylinder, a piece of sophisticated engineering that finally found its way into production automobiles



in the late 1980s. It's a pretty good bet that Colonel Vincent was at least in part responsible for this engine that dominated the Gold Cup for 15 years.

If 1922 marked a year of accomplishment for Jesse Vincent, it marked the end of a long and productive relationship between two of speedboat racing's giants.

Soon after Baldy Ryan, Chris Smith's original patron and racing collaborator, dissipated his fortune and disappeared from the racing scene, Chris Smith established with Gar Wood the boatbuilding and racing partnership that was responsible for Gar Wood's five Gold Cup victories. Gar Wood financed, Napoleon Lisee and Chris Smith designed and built, and Gar Wood drove the fastest boats of the times.

One suspects that at first Gar Wood's personality was complementary to that of Chris Smith. Smith was easygoing and Wood was competitive and demanding. But the attraction of opposites is often short-lived, and when Wood and Smith dissolved their partnership they became competitors in both racing and the boatbuilding business.

Gar Wood drove a Chris Smith hull in the 1922 Gold Cup, and although sources suggest that all the Chris Smith hulls in the race were identical, Wood was embittered, thinking that Smith had designed a superior hull for Vincent. An era of Wood–Smith collaboration was over.

Packard Chriscraft, already a catalyst of conflict that shaped the lives of speedboat racing's most influential men, in 1934 passed into the racing stable of Harry B. Greening. Commodore Greening was a Muskoka-area Canadian sportsman and racing challenger who matched and sometimes defeated America's fastest. Greening's *Rainbows*, many built by Ditchburn, were regular and formidable challengers for the most prestigious cups and trophies both north and south of the border.

Little remains of the original *Packard Chriscraft*. Over the years the boat has been modified to accept a number of power plants. When Greening purchased her she was Liberty-powered. Most recently she was modified to allow the installation of a contemporary 650 horsepower Italian BRM engine.

No matter. Throughout the brief history of racing, boats have been changed to suit the times. And in performance her pedigree is obvious. "She's the best riding boat I've ever driven," according to Muskokan Jack Buwalda, the owner of Beaumaris Marine. "You could put 1000 horsepower in her and she would handle it."

Some question the accuracy of *Rainbow IX's* provenance. They criticize modifications. They claim she's not the boat that won the Gold Cup. Others say that Canadian newspaper photographs from the 1930s show the white-sided *Packard Chriscraft* with both the original G38 Gold Cup racing number and T-31, identifying the boat as a sweepstakes racer.

It's the kind of controversy that will fuel conversations at the yacht club bar well past the turn of the century, and it's entirely consistent with the history of the boat.

Perhaps it's not important. *Rainbow IX* is old, she's on the water, she's fast, and no one's proven she isn't Jesse Vincent's winner. She's a boat entwined in the lives of four of speedboat racing's greats: Harry B. Greening, Gar Wood, Christopher Columbus Smith, and Colonel Jesse G. Vincent.

And attitudes have changed. Everything's more serious now. It wasn't always that way. As Mrs. Allen Flye, Harry Greening's granddaughter, remembers, "They didn't take themselves too seriously. They seemed to end up laughing at their misfortune. They seemed to have more fun."